TRANSACTIONS
AMERICAN
GEOPHYSICAL UNION

A QUARTERLY JOURNAL DEVOTED TO
MATTERS OF GENERAL INTEREST IN
THE BROAD FIELD OF GEOPHYSICS

Volume 43
1962

Published by the American Geophysical Union
of the
National Academy of Sciences
National Research Council
Washington, D. C.
1962

Transactions, American Geophysical Union, Vol. 43, No. 1, March 1962

CONTENTS

Richard Montgomery Field ..... H. H. Hess 1

ARTICLES

Comments on Progress in the Atmospheric Sciences ..... Thomas F. Malone 5
Progress Report on an International Decade for Hydrology ..... W. B. Langbein 9
National Oceanographic Data Center Celebrates First Anniversary 10
The Hawaii Institute of Geophysics ..... C. S. Ramage 14
The Science and Services of Hydrology in the Soviet Union ..... James S. Sweet 20

REVIEWS

G. E. Murray, Geology of the Atlantic and Gulf Coastal Province of North America ..... Harry E. LeGrand 34
A. E. Scheidegger, Theoretical Geomorphology ..... William F. Tanner 34
W. R. Piggott and K. Rawer (Eds.), URSI Handbook of Ionogram Interpretation ..... R. G. Rastogi 35
Joseph W. Chamberlain, Physics of the Aurora and Airglow ..... Carl W. Gartlein 35
Bert Bolin (Ed.), The Atmosphere and the Sea in Motion, Scientific Contributions to the Rossby Memorial Volume ..... Philip F. Clapp 36
Seymour Hess, Introduction to Theoretical Meteorology ..... Conrad P. Mook 37
Simo Laurila and W. A. Heiskanen (Eds.), Symposium: Geodesy in the Space Age ..... William M. Kaula 37

PUBLICATIONS AND TRANSLATIONS OF INTEREST TO GEOPHYSICISTS

Recent Publications of Interest to Geophysicists 38
Contents of Bulletin (Izvestiya), Academy of Sciences, U.S.S.R., Geophysics Series, September–October, 1961 40
Contents of Geodesy and Cartography, U.S.S.R., March–August, 1961 41
English Translations of Russian and Other Scientific Papers and Journals 43

NOTES AND PERSONALIA

Notes 47
Personalia 51

UNION, SECTION, AND COMMITTEE ACTIVITIES

Minutes of the Council Meeting, AGU, December 27, 1961 53
First Western National Meeting, December 27–29, 1961, Los Angeles, California 73
Meeting of the Geophysical Society of Hawaii 80
Meeting of the U. S. National Commission for UNESCO 80

SPECIAL ANNOUNCEMENTS

Twenty-Fourth William Bowie Medalist Named for 1962 Award 81
Forty-Third Annual Meeting of AGU To Be Held in Washington, D. C., April 25–28, 1962 81
IASH Bulletin 81
Availability of Hydrology Proceedings, XII General Assembly of IUGG, 1960 Notice to Members and Subscribers Concerning Change of Address 81
XIII General Assembly of IUGG, Berkeley, California, August 19–31, 1963 82
Symposium on Upper Atmosphere Emissions To Be Held in June 1962 84

(*Continued inside back cover*)

CONTENTS

(*Continued from back cover*)

IGY BULLETINS

Bulletin No. 55 85
Explorer X Magnetic-Field Measurements 85
Correlation of Magnetic-Field Fluctuations at the Earth and in Interplanetary Space 93
Explorer X Interplanetary-Plasma Observations 96
COSPAR's Third International Space Science Symposium 99
International Meteorological Satellite Workshop 101
Bibliographic Notes 102
The Atmospheres of Mars and Venus 104

Bulletin No. 56 105
Wind and Temperature Oscillations in the Tropical Stratosphere 105
Preliminary Results from Arctic Ocean Drifting Station Charlie 110
Fifth Meeting of SCAR 116
Bibliographic Notes 124

Bulletin No. 57 125
Whistlers-West—Results from the IGY/IGC-59 Synoptic Program 125
National Center for Atmospheric Research 134
Solar-Terrestrial Activity during the Second Half of 1961 136
Activities of The Space Science Board 139
Bibliographic Notes 144

Supporting Members ..... following page 144

OFFICERS OF THE UNION

THOMAS F. MALONE, *President*
GEORGE P. WOOLLARD, *Vice President*
A. NELSON SAYRE, *General Secretary*
WALDO E. SMITH, *Executive Secretary*

OFFICERS OF THE SECTIONS

Geodesy

FLOYD W. HOUGH, *President*
CHARLES A. WHITTEN, *Vice President*
BUFORD K. MEADE, *Secretary*

Seismology

JAMES A. PEOPLES, JR., *President*
JACK E. OLIVER, *Vice President*
BENJAMIN F. HOWELL, JR., *Secretary*

Meteorology

MORRIS NEIBURGER, *President*
HENRY G. HOUGHTON, *Vice President*
WOODROW C. JACOBS, *Secretary*

Geomagnetism and Aeronomy

C. T. ELVEY, *President*
E. H. VESTINE, *Vice President*
J. HUGH NELSON, *Secretary*

Oceanography

DONALD W. PRITCHARD, *President*
ROBERT S. ARTHUR, *Vice President*
ARTHUR E. MAXWELL, *Secretary*

Volcanology, Geochemistry, and Petrology

HATTEN S. YODER, JR., *President*
EDWARD D. GOLDBERG, *Vice President*
DAVID R. WONES, *Secretary*

Hydrology

WILLIAM C. ACKERMANN, *President*
DAVID K. TODD, *Vice President*
RALPH N. WILSON, *Secretary*

Tectonophysics

LOUIS B. SLICHTER, *President*
DAVID T. GRIGGS, *Vice President*
IRIS BORG, *Secretary*

Transactions, American Geophysical Union, Vol. 43, No. 2, June, 1962

CONTENTS

President's Page ..... Joseph Kaplan 145

Twenty-Fourth Award of the William Bowie Medal 147
- Citation ..... Walter Orr Roberts 147
- Presentation ..... Thomas F. Malone 149
- Acceptance and Response ..... Sydney Chapman 149
- Previous Recipients of the William Bowie Medal 150

First Presentation of the John Adam Fleming Award 151
- Citation ..... Frederick J. Agnich 151
- Presentation ..... Thomas F. Malone 152
- Acceptance and Response ..... Lloyd V. Berkner 153
- The Principles of the Award 153
- John Adam Fleming (1877–1956) 153

First Presentation of the James B. Macelwane Award 155
- Citation ..... Earl G. Droessler 155
- Presentation ..... Thomas F. Malone 156
- Acceptance and Response ..... James N. Brune 156
- Award Statement 156
- James B. Macelwane (1883–1956) 157

ARTICLES

Geophysics Today ..... Lloyd V. Berkner 159

Geophysics on the Move ..... Waldo E. Smith 167

Swedish 'Operation Ice Tunnel' ..... Holger Lundbergh 175

REVIEWS

H. E. Landsberg and J. Van Mieghem, Advances in Geophysics, Vol. 8 ..... A. H. Waynick 177

H. Heastie and P. M. Stephenson, Upper Winds over the World, Parts I and II ..... H. E. Landsberg 177

L. V. Kurnosova (Ed.), Artificial Earth Satellites, Vols. 1–6 ..... W. N. Hess and Others 178

John S. Steinhart and Robert P. Meyer (Eds.), Explosion Studies of Continental Structure ..... B. F. Howell, Jr. 182

Mary Sears (Ed.), Oceanography; Invited Lectures Presented at the International Oceanographic Congress, Held in New York, 31 August–12 September 1959 ..... John Lyman 182

Handbook of Meteorological Instruments, Part II: Instruments for Upper Air Observations ..... A. K. Showalter 183

Zdenek Kopal, Figures of Equilibrium of Celestial Bodies ..... William M. Kaula 183

PUBLICATIONS AND TRANSLATIONS OF INTEREST TO GEOPHYSICISTS

Recent Publications of Interest to Geophysicists 184

Contents of Bulletin (Izvestiya), Academy of Sciences, USSR Geophysics Series, November 1961—January 1962 186

Contents of Geodesy and Cartography, USSR, September—December, 1961 187

English Translations of Russian and Other Scientific Papers and Journals 189

NOTES AND PERSONALIA

Notes 194

Personalia 196

UNION, SECTION, AND COMMITTEE ACTIVITIES

Forty-Third Annual Meeting 202
- Smoker 202
- Honors Evening Session 202
- General Assembly: Papers on Frontiers in Geophysics, and Business Meeting ..... A. Nelson Sayre and Waldo E. Smith 202
  - Summary of the General Secretary's Report 203
  - Report of the President 204
  - Reports of Standing Committees 204
  - Reports of Special Committees 204
  - Unfinished and New Business 205
  - Adjournment 205

(*Continued inside back cover*)

CONTENTS

(Continued from back cover)

Banquet 205
Minutes of the Sections and Special Sessions 205
Appendix A—Geodesy 205
Appendix B—Seismology 206
Appendix C—Meteorology 207
Appendix D—Geomagnetism and Aeronomy 209
Appendix E—Oceanography 210
Appendix F—Volcanology, Geochemistry, and Petrology 212
Appendix G—Hydrology 214
Appendix H—Tectonophysics 216
Appendix I—Planetary Sciences 216

SPECIAL ANNOUNCEMENTS

Pacific Northwest Regional Meeting 220
Second Western National Meeting 220
International Symposium on Equatorial Aeronomy 220
Forty-Fourth Annual Meeting, AGU 220
English Edition of Russian Publications in Oceanography 220
English Edition of Geomagnetism and Aeronomy 220

IGY BULLETINS

Bulletin No. 58 221
Summary of Early Results from Explorer XII 221
US Antarctic Research Ship Eltanin 228
The Tiros IV Meteorological Satellite 232
Sunspot Numbers 237
Bibliographic Notes 239

Bulletin No. 59 241
Ariel—Joint United Kingdom-United States Ionosphere Satellite 241
First Meeting of the Committee for the IQSY, 1964–65 245
Antarctic Notes 255
Progress toward Completion of the *Annals of the International Geophysical Year* 257
Bibliographic Notes 259

Bulletin No. 60 261
Proposed United States Program for the International Year of the Quiet Sun, 1964–65 261
Bibliographic Notes 276

Supporting Members ..... following page 276

OFFICERS OF THE UNION

THOMAS F. MALONE, *President*
GEORGE P. WOOLLARD, *Vice President*
A. NELSON SAYRE, *General Secretary*
WALDO E. SMITH, *Executive Secretary*

OFFICERS OF THE SECTIONS

Geodesy

FLOYD W. HOUGH, *President*
CHARLES A. WHITTEN, *Vice President*
BUFORD K. MEADE, *Secretary*

Seismology

JAMES A. PEOPLES, JR., *President*
JACK E. OLIVER, *Vice President*
BENJAMIN F. HOWELL, JR., *Secretary*

Meteorology

MORRIS NEIBURGER, *President*
HENRY G. HOUGHTON, *Vice President*
WOODROW C. JACOBS, *Secretary*

Geomagnetism and Aeronomy

C. T. ELVEY, *President*
E. H. VESTINE, *Vice President*
J. HUGH NELSON, *Secretary*

Oceanography

DONALD W. PRITCHARD, *President*
ROBERT S. ARTHUR, *Vice President*
ARTHUR E. MAXWELL, *Secretary*

Volcanology, Geochemistry, and Petrology

HATTEN S. YODER, JR., *President*
EDWARD D. GOLDBERG, *Vice President*
DAVID R. WONES, *Secretary*

Hydrology

WILLIAM C. ACKERMANN, *President*
DAVID K. TODD, *Vice President*
RALPH N. WILSON, *Secretary*

Tectonophysics

LOUIS B. SLICHTER, *President*
DAVID T. GRIGGS, *Vice President*
IRIS BORG, *Secretary*

Transactions, American Geophysical Union, Vol. 43, No. 3, September 1962

CONTENTS

President's Page ..... William C. Ackermann 277

ARTICLES

Space in Geophysics ..... Homer E. Newell 279
The Canadian Scientific Committee for the Upper Mantle Project ..... Robert J. Uffen 293
Visiting Scientist Program in Oceanography ..... Norris W. Rakestraw 299

REVIEWS

Calvin J. Heusser, Late-Pleistocene Environments of North Pacific North America ..... Troy L. Péwé 301
Ralph E. Grim, Applied Clay Mineralogy ..... George T. Faust 301
Victor K. LaMer (Ed.), Retardation of Evaporation by Monolayers: Transport Processes ..... G. Earl Harbeck, Jr. 301
F. Pasquill, Atmospheric Diffusion ..... F. A. Gifford 302

PUBLICATIONS AND TRANSLATIONS OF INTEREST TO GEOPHYSICISTS

Recent Publications of Interest to Geophysicists 303
Contents of Bulletin (Izvestiya), Academy of Sciences, USSR Geophysics Series, February–April, 1962 305
English Translations of Russian and Other Scientific Papers and Journals 306

NOTES AND PERSONALIA

Notes 311
Personalia 315

UNION, SECTION, AND COMMITTEE ACTIVITIES

Minutes of the Council Meeting, American Geophysical Union, April 25, 1962
Report of the General Secretary 318
International Participation 322
Publications 323
Standing Committees 323
Special Committees 324
Reports of Sections 324
Divisions of the NAS-NRC 324
Affiliated Organizations 325
Government Affiliated Groups 325
Unfinished Business 325
Adjournment 325
Appendix 1—Report of the Secretary for International Participation ..... J. Wallace Joyce 325
Appendix 2—Report from the Office of International Relations, NAS ..... Wallace W. Atwood 326
Appendix 3—Report of the Editors, Journal of Geophysical Research ..... Philip H. Abelson and James A. Peoples, Jr. 326
Appendix 4—Report on the Proposed Review Journal 327
Appendix 5—Report of the Geophysical Monograph Board ..... Alan H. Shapley 327
Appendix 6—Report of the Russian Translation Board ..... Perry Byerly 328
Appendix 7—Report of the Committee on Audit ..... A. G. McNish 329
Appendix 8—Report of the Planning Committee for Planetary Sciences ..... Homer E. Newell 336
Appendix 9—Report of the Committee for the Study of the Metric System in the United States ..... Lansing G. Simmons 337
Appendix 10—Report of the Committee on Cosmic-Terrestrial Relationships ..... Walter Orr Roberts 338
Appendix 11—Report on the Visiting Scientists Program in Oceanography ..... Norris W. Rakestraw 338
Appendix 12—Report on the Proposed Visiting Scientists Program in Geophysics 338
Appendix 13—Report of the Section of Hydrology ..... William C. Ackermann 339
Appendix 14—Report of the AGU Representatives, American Association for the Advancement of Science ..... Walter Orr Roberts and Martin A. Pomerantz 340
Appendix 15—Report of AGU Representatives, American Geological Institute ..... James R. Balsley and James A. Peoples, Jr. 341
Appendix 16—Report of Representative, Department of Commerce ..... F. W. Reichelderfer 342

(*Continued inside back cover*)

CONTENTS

(*Continued from back cover*)

Meetings of the Geophysical Society of Hawaii 342
American Academy of Political and Social Science 342
World Food Forum 342

SPECIAL ANNOUNCEMENTS

Corrigendum 343
Pacific Northwest Regional Meeting 343
Pacific Southwest Region 343
Second Western National Meeting 343
Forty-Fourth Annual Meeting of AGU, April 17-20, 1963 343
IAG Jubilee 343
Price Increase for Izvestiya 343
New Russian Translations 343

IG BULLETINS

Bulletin No. 61 345
Space Research Data Interchange: COSPAR Guide 345
Rocket, Satellite, and Space-Probe Measurements of Interplanetary Dust 351
The Year of the Quiet Sun: The Proposed Programs of Belgium, Czechoslovakia, Finland, and France 361
Bibliographic Notes 367

Bulletin No. 62 369
Ice-Flow Studies on the Ice Dome of Roosevelt Island, Antarctica 369
Joint Institute for Laboratory Astrophysics 372
Early Experimental Results from Telstar I 374
The Fifth Tiros Weather Satellite 379
The Year of the Quiet Sun: The Proposed Program of the USSR 382
Bibliographic Notes 388

Bulletin No. 63 389
Upper-Atmosphere Density Measurements 389
The Filchner Ice Shelf, Antarctica 393
Recent Activities of COSPAR 399
The Year of the Quiet Sun 404
Bibliographic Notes 407

Supporting Members ..... following page 407

OFFICERS OF THE UNION

THOMAS F. MALONE, *President*
GEORGE P. WOOLLARD, *Vice President*
A. NELSON SAYRE, *General Secretary*
WALDO E. SMITH, *Executive Secretary*

OFFICERS OF THE SECTIONS

Geodesy

FLOYD W. HOUGH, *President*
CHARLES A. WHITTEN, *Vice President*
BUFORD K. MEADE, *Secretary*

Seismology

JAMES A. PEOPLES, JR., *President*
JACK E. OLIVER, *Vice President*
BENJAMIN F. HOWELL, JR., *Secretary*

Meteorology

MORRIS NEIBURGER, *President*
HENRY G. HOUGHTON, *Vice President*
WOODROW C. JACOBS, *Secretary*

Geomagnetism and Aeronomy

C. T. ELVEY, *President*
E. H. VESTINE, *Vice President*
J. HUGH NELSON, *Secretary*

Oceanography

DONALD W. PRITCHARD, *President*
ROBERT S. ARTHUR, *Vice President*
ARTHUR E. MAXWELL, *Secretary*

Volcanology, Geochemistry, and Petrology

HATTEN S. YODER, JR., *President*
EDWARD D. GOLDBERG, *Vice President*
DAVID R. WONES, *Secretary*

Hydrology

WILLIAM C. ACKERMANN, *President*
DAVID K. TODD, *Vice President*
RALPH N. WILSON, *Secretary*

Tectonophysics

LOUIS B. SLICHTER, *President*
DAVID T. GRIGGS, *Vice President*
IRIS BORG, *Secretary*

Transactions, American Geophysical Union, Vol. 43, No. 4, December 1962

CONTENTS

President's Page ..... Thomas F. Malone 409

PROGRAM OF THE SECOND WESTERN NATIONAL MEETING

Map of Meeting Places 412
Schedule of Sessions 413
Notes 414
General Meetings 415
Meetings of the Sections 415
Section of Geodesy Abstracts 426
Section of Seismology Abstracts 427
Section of Meteorology Abstracts 430
Section of Geomagnetism and Aeronomy Abstracts 434
Section of Oceanography Abstracts 442
Section of Volcanology, Geochemistry, and Petrology Abstracts 445
Section of Hydrology Abstracts 450
Section of Tectonophysics Abstracts 455
Section of Planetary Sciences Abstracts 457

ARTICLES

A Rationale for Weather-Control Research
S. M. Greenfield, R. E. Huschke, Yale Mintz, R. R. Rapp, and J. D. Sartor 469

Inter-University Conference on Hydrology 491

REVIEWS

R. H. Wentorf, Jr. (Ed.), Modern Very High Pressure Techniques ..... H. S. Yoder, Jr. 497
A. Rittmann, Volcanoes and Their Activity ..... Gordon A. Macdonald 497
Proceedings of the International Meteorological Satellite Workshop ..... W. W. Kellogg 498
Herbert Riehl, Jet Streams of the Atmosphere ..... Frederick Sanders 499
M. A. Ellison (Ed.), IGY Solar Activity Maps ..... Walter Orr Roberts 500

PUBLICATIONS AND TRANSLATIONS OF INTEREST TO GEOPHYSICISTS

Recent Publications of Interest to Geophysicists 501
Contents of Bulletin (Izvestiya), Academy of Sciences, USSR Geophysics Series, May—July 1962 503
Contents of Geodesy and Aerophotography, USSR 504
Contents of Oceanography Translations 504
English Translations of Russian and Other Scientific Papers and Journals 506

NOTES AND PERSONALIA

Notes 511
Personalia 513

UNION, SECTION, AND COMMITTEE ACTIVITIES

Fellows of the American Geophysical Union 517

SPECIAL ANNOUNCEMENTS

Forty-Fourth Annual Meeting of the AGU, April 17 through 20, 1963, in Washington, D. C. 519
AGU Associate Members 520
1963 IUGG Meeting in California 520

8193 G

(*Continued inside back cover*)

CONTENTS

(*Continued from back cover*)

Geologists Needed by Peace Corps 520
Sedimentation Conference To Be Held 520
Third Conference on Hurricanes and Tropical Meteorology 521
The Upper Mantle Project 521

IG BULLETINS

Bulletin No. 64 523
Artificial Radiation Belt from the Starfish High-Altitude Nuclear Test *Mariner II* Space Flight to Venus 523
Mariner II Space Flight to Venus 528
Rocket and Satellite Meteorology: Summary of Scientific Results Reported at the First International Symposium on Rocket and Satellite Meteorology 536
The Year of the Quiet Sun: The Proposed Programs of the Netherlands and New Zealand 543
Bibliographic Notes 545
Bulletin No. 65 547
Early Cruises of the Antarctic Research Ship *Eltanin* 547
Alouette—Canadian–US Ionospheric Topside Sounder Satellite 555
Geodetic Studies Using Satellites, Summary of Papers Presented at the Symposium on the Use of Artifical Satellites for Geodesy 561
Bibliographic Notes 565
Bulletin No. 66 569
The Upper Mantle Project 569
Bibliographic Notes 585
Index of Names for Volume 43 587
Index of Subjects for Volume 43 590
Supporting Members ..... following page 591

OFFICERS OF THE UNION

THOMAS F. MALONE, *President*
GEORGE P. WOOLLARD, *Vice President*
A. NELSON SAYRE, *General Secretary*
J. WALLACE JOYCE, *Secretary for International Participation*
WALDO E. SMITH, *Executive Secretary*

OFFICERS OF THE SECTIONS

Geodesy
FLOYD W. HOUGH, *President*
CHARLES A. WHITTEN, *Vice President*
BUFORD K. MEADE, *Secretary*

Seismology
JAMES A. PEOPLES, JR., *President*
JACK E. OLIVER, *Vice President*
BENJAMIN F. HOWELL, JR., *Secretary*

Meteorology
MORRIS NEIBURGER, *President*
HENRY G. HOUGHTON, *Vice President*
WOODROW C. JACOBS, *Secretary*

Geomagnetism and Aeronomy
C. T. ELVEY, *President*
E. H. VESTINE, *Vice President*
J. HUGH NELSON, *Secretary*

Oceanography
DONALD W. PRITCHARD, *President*
ROBERT S. ARTHUR, *Vice President*
ARTHUR E. MAXWELL, *Secretary*

Volcanology, Geochemistry, and Petrology
HATTEN S. YODER, JR., *President*
EDWARD D. GOLDBERG, *Vice President*
DAVID R. WONES, *Secretary*

Hydrology
WILLIAM C. ACKERMANN, *President*
DAVID K. TODD, *Vice President*
RALPH N. WILSON, *Secretary*

Tectonophysics
LOUIS B. SLICHTER, *President*
DAVID T. GRIGGS, *Vice President*
IRIS BORG, *Secretary*

Planetary Sciences
HOMER E. NEWELL, *President*
ROBERT JASTROW, *Vice President*
A. G. W. CAMERON, *Secretary*